

What is Claimed:

1. A valve deactivation system, comprising:

a deactivation rocker arm assembly; and

a free motion spring assembly.

2. The valve deactivation system of claim 1, wherein said deactivation rocker arm assembly comprises:

an elongate rocker arm, an aperture defined by said rocker arm;

a center post slidably disposed within said aperture, said center post configured for engaging a valve stem of a valve of an internal combustion engine; and

coupling means selectively coupling together and decoupling said center post and said rocker arm.

3. The valve deactivation system of claim 2, wherein said rocker arm includes an end, said aperture being defined by said end.

4. The valve deactivation system of claim 2, wherein said end of said rocker arm defines a first pin bore and a second pin bore, said first pin bore and said second pin bore being substantially concentric relative to each other, said center post defining a middle pin bore, said coupling means comprises a locking pin assembly, said locking pin assembly including an actuating pin, a second pin member and a middle pin member, said actuating pin member slidably disposed at least partially within said first pin bore, said second pin member slidably disposed at least partially within said second pin bore, and said middle pin member slidably disposed at least partially within said middle pin bore.

5. The valve deactivation system of claim 4, wherein said deactivation rocker arm

assembly further comprises a pin spring disposed within said second pin bore, said pin spring normally biasing said locking pin assembly toward a default position wherein said actuator pin member extends a predetermined distance from disposition within said first pin bore in a direction away from said center post, said middle pin member extends from disposition within said middle pin bore into said first pin bore, and said second pin member extends from disposition within said second pin bore into said middle pin bore to thereby couple said center post to said rocker arm.

Sub 6. The valve deactivation system of claim 2, wherein said free motion spring assembly comprises:

an inner spring retainer surrounding a portion of the valve stem;
an outer spring retainer surrounding a portion of the valve stem;
an inner spring surrounding a portion of the valve stem, said inner spring being disposed between a disk cap associated with the valve stem and said inner spring retainer; and
an outer spring surrounding said inner spring, said outer spring being disposed between said outer spring retainer and the disk cap.

Sub 7. The valve deactivation system of claim 6, wherein said rocker arm includes elongate arms, said arms being one of attached to and integral with said body of said rocker arm and extending therefrom, said arms engaging one of said inner spring retainer and said outer spring retainer.

8. The valve deactivation system of claim 7, wherein said arms extend in a direction that is generally parallel with said body of said rocker arm, said outer spring biasing said outer spring retainer into engagement with said arms, said inner spring retainer configured for being coupled

to the valve stem.

9. The valve deactivation system of claim 8, wherein said outer spring retainer includes a rim, said outer spring normally biasing said rim into engagement with a periphery of said inner spring retainer.

10. The valve deactivation system of claim 7, wherein said outer spring retainer includes slots, each of said slots corresponding to a respective one of said arms, said arms extending in a direction generally perpendicular to said body of said rocker arm, each of said arms extending through a respective one of said slots, said inner spring biasing said inner spring retainer into engagement with said arms, said outer spring retainer configured for being coupled to the valve stem.

Sub 11. The valve deactivation system of claim 9, wherein said inner spring retainer is disposed below said outer spring retainer relative to said rocker arm, said inner spring normally biasing said inner spring retainer into engagement with said outer spring retainer.

Sub 12. A deactivation rocker arm assembly, comprising:
an elongate rocker arm having an end, an aperture defined by said end;
a center post slidingly disposed within said aperture, said center post configured for engaging a valve stem of a valve of an internal combustion engine; and
coupling means selectively coupling together and decoupling said center post and said rocker arm.

13. The deactivation rocker arm assembly of claim 12, wherein said end of said rocker arm defines a first pin bore and a second pin bore, said first pin bore and said second pin bore being substantially concentric relative to each other, said center post defining a middle pin bore,

Sub 5
said coupling means comprises a locking pin assembly, said locking pin assembly including an actuating pin, a second pin member and a middle pin member, said actuating pin member slidably disposed at least partially within said first pin bore, said second pin member slidably disposed at least partially within said second pin bore, and said middle pin member slidably disposed at least partially within said middle pin bore.

Sub 8
14. The deactivation rocker arm assembly of claim 13, further comprising a pin spring disposed within said second pin bore, said pin spring normally biasing said locking pin assembly toward a default position wherein said actuator pin member extends a predetermined distance from disposition within said first pin bore in a direction away from said center post, said middle pin member extends from disposition within said middle pin bore into said first pin bore, and said second pin member extends from disposition within said second pin bore into said middle pin bore to thereby couple said center post to said rocker arm.

Sub 9
15. The deactivation rocker arm assembly of claim 12, wherein said rocker arm includes elongate arms, said arms being one of attached to and integral with said body of said rocker arm and extending therefrom.

Sub 10
16. The deactivation rocker arm assembly of claim 15, wherein said arms extend from said end of said rocker arm in a manner that is generally parallel with said rocker arm.

17. The deactivation rocker arm assembly of claim 15, wherein said arms extend from said end of said rocker arm in a manner that is generally perpendicular with said rocker arm.

Sub 11
18. The deactivation rocker arm assembly of claim 12, wherein said rocker arm defines a roller orifice, a roller being disposed within said roller orifice and being coupled to said rocker arm, said roller configured for engaging a cam of the internal combustion engine.

19. A free motion spring assembly, comprising:
an inner spring retainer surrounding a portion of a valve stem of a valve of an internal combustion engine;
an outer spring retainer surrounding a portion of the valve stem;
5 an inner spring surrounding a portion of the valve stem, said inner spring being disposed between a disk cap associated with the valve stem and said spring retainer; and
an outer spring surrounding the inner spring, said outer spring being disposed between said outer spring retainer and the disk cap.

20. The free motion spring assembly of claim 19, wherein one of said outer spring retainer and said inner spring retainer is configured for being coupled to the valve stem.

21. The free motion spring assembly of claim 19, wherein said outer spring retainer includes a rim, said outer spring normally biasing said rim into engagement with a periphery of said inner spring retainer, said inner spring configured for engaging the valve stem.

22. The free motion spring assembly of claim 19, wherein said outer spring retainer includes slots, said inner spring retainer being disposed below said outer spring retainer relative a rocker arm, said outer spring retainer configured for being coupled to the valve stem.

Sub 23. An internal combustion engine, comprising:
B4 an elongate rocker arm, an aperture defined by said rocker arm;
a center post slidably disposed within said aperture, said center post engaging a valve stem of a valve of said internal combustion engine; and
5 coupling means selectively coupling together and decoupling said center post and said rocker arm.

Sub 6 24. The internal combustion engine of claim 23, further comprising a free motion spring assembly, said free motion spring assembly including:

an inner spring retainer surrounding a portion of said valve stem;

an outer spring retainer surrounding a portion of said valve stem;

5 an inner spring surrounding a portion of said valve stem, said inner spring being disposed between said inner spring retainer and a disk cap of said internal combustion engine, said disk cap being associated with said valve stem; and

an outer spring surrounding said inner spring, said outer spring being disposed between said outer spring retainer and said disk cap.

Sub 12 13 25. The internal combustion engine of claim 24, wherein one of said inner spring retainer and said outer spring retainer is coupled to said valve stem.